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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/938,708	08/24/2001	Wayne Biao Liu	DSC1P003	1771

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EXAMINER

BRODA, SAMUEL

ART UNIT	PAPER NUMBER
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2123

DATE MAILED: 02/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/938,708

Applicant(s)

LIU, WAYNE BIAO

Examiner

Samuel Broda

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 August 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-44 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-44 is/are rejected.
- 7) ☒ Claim(s) 1-44 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 August 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 2/20/02, 5/23/02.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

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DETAILED ACTION

1. Claims 1-44 have been examined.

Drawings

2. Applicant's formal drawings have been reviewed and approved.

Claim Objections

3. The following is a partial quotation of 37 CFR § 1.75:

...

(g) The least restrictive claim should be presented as claim number 1, and all dependent claims should be grouped together with the claim or claims to which they refer to the extent practicable.

3.1 Claims 1-44 are objected to under 37 CFR § 1.75(g) because dependent claims do not appear grouped together, making the claim groups difficult to follow. There appears no logical reason for the current claim groupings and numbering. Correction is required.

Claim Rejections - 35 U.S.C. § 112, Second Paragraph

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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4.1 Claims 1-44 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention.

4.2 Regarding claims 1-7, 24-29, and 35-40, these claims are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. The omitted steps are the steps generating the transitive effects machines for the reduced components using assumed reductions. These steps appear necessary as the Specification at page 20 lines 5-12 describes the use of assumed reductions and then states at lines 13-14 that: "In this way, a set of reduced transitive effect machines may be generated for desired components in the state space."

4.3 Regarding claim 8, this claim appears to only include a single step and the generation of reduced transitive effect machines appears to describe an intended outcome instead of the steps necessary to generate the reduced state space representation.

4.4 Regarding claims 39-44, these claims are directed at a system and written in means-plus-function format, yet the claims appear to recite no computer hardware means as part of the system. A computer system cannot be comprised solely of program code as means. Additionally, the Specification does not appear to disclose structure corresponding to computer hardware for performing the recited functions.

4.5 Dependent claims not described above are rejected based on their dependency to a rejected claim.

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Claim Rejections - 35 U.S.C. § 101

5. The following is a quotation of 35 U.S.C. 101:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

5.1 Method claims 1-27 are rejected for reciting a process that is not directed to the technological arts. The language of each claim raises a question as to whether the claim is directed merely to an abstract idea that is not tied to a technological art, environment, or machine which would result in a practical application producing a concrete, useful, and tangible result to form the basis of statutory subject matter under 35 U.S.C. 101.

In each of claims 1-27, the method steps appear achievable by a person using mental steps or pencil and paper. The example model reduction shown at pages 14-25 of the Specification similarly appears achievable without resort to a technological art.

Claim Rejections - 35 U.S.C. § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

...

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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6.1 Claims 1-7, 28, and 39-40 are rejected under 35 U.S.C. 102(b) as being anticipated by Lee et al, "Ordering Method for Reducing State Space in Compositional Verification," 1999 IEEE International Conference on Systems, Man, and Cybernetics, Vol. 1, pp. 806-811 (October 1999).

6.2 Regarding claims 1, 28, and 39-40, Lee et al teaches a method for generating a reduced state space representation for a model in a compositional state system, the model comprising a selected set of components, each component comprising one or more states and one or more events, the model comprising interactions associated with events, the reduced state space representation being defined with respect to a set of events of interest selected from the events in the set of components the method comprising the following steps:

a. for each component in the set of components, defining a transitive effect machine for the component such that the states of the transitive effect machine represent the states of the component and the events of the transitive effect machine represent the transitive effects of interactions associated with transitions of the component, the transitive effects being defined relative to the set of components, and the set of events of interest [transitive effect machines corresponding to "CDEVs" "Compositional Discrete Event system Specification", Section 2 CDEVs Compositional Verification Framework, pages 806-807], and

b. reducing each of the defined transitive effect machines, the reduction including the classification of states within a single transitive effect machine to permit a set of states in the said transitive effect machine to be grouped into a single class when each state in the said set of states

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is characterized by common properties with respect to the set of events of interest [reduction performed on “Interest Events Set” using incremental composition and minimization; see Figure 1 page 807 and page 809 column 1 paragraph 2 describing the transformation of an overall system into a model containing the Interest Events Set].

Therefore, Lee et al anticipates claim 1.

6.3 Regarding claims 2-7, the method of Lee et al as applied to the classical dining philosopher problem supports labelled transition system models with transitive interactions defined relative to {bisimulation, simulation, observational, safety} equivalence and includes BDDs; see Figs 2-4 and corresponding text at pages 808-810.

Allowable Subject Matter

7. Claims 8-27, 29-38, and 41-44 would be allowable if rewritten to overcome the rejection(s) under one or both of 35 U.S.C. {101, 112 second paragraph}, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to Applicant’s disclosure. Reference to Beer et al, U. S. Patent 6,715,107 is cited as teaching the reduction of a computation tree based on user definitions.

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Reference to Yang, U. S. Patent 6,643,827 is cited as teaching symbolic model checking of BDDs using partitioned transition relations.

Reference to Holzmann et al, U. S. Patent 5,615,137 is cited as teaching state space reduction performed using information from the description and the specification to divide transitions from a node into per-process bundles.

Reference to Christensen et al, "Modular Analysis of Petri Nets," Computer Journal, Vol. 43 No. 3, pp. 224-242 (2000), is cited as teaching the modular analysis of Petri nets using Place/Transition nets interact via shared places and shared transitions.

Reference to Hou et al, "Model Reductions in MDG-Based Model Checking," IEEE Proceedings of the 13th Annual International ASIC/SOC Conference, pp. 347-351 (September 2000), is cited as teaching model checking with multiway decision graphs.

Reference to Baumgartner et al, "An Overview and Application of Model Reduction Techniques in Formal Verification," 1998 IEEE International Conference on Performance, Computing and Communications, pp. 165-171 (February 1998), is cited as teaching an overview of model reduction techniques.

9. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Samuel Broda, whose telephone number is (571) 272-3709. The Examiner can normally be reached on Mondays through Fridays from 8:00 AM – 4:30 PM.

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If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Kevin Teska, can be reached at (571) 272-3716. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the group receptionist, whose telephone number is (571) 272-2100.

A handwritten signature in black ink, appearing to read 'S. Broda'.

**SAMUEL BRODA, ESQ.
PRIMARY EXAMINER**